

# 太陽電池熱回收與散熱裝置

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簡歷：(可列出相關連結，例如系所、研究室網頁)

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## 市場及需求：

市售太陽電池模組發電效率約 15%~20%，太陽光被吸收後有 80%~85% 轉換成廢熱排掉。回收這些廢熱，轉為可用熱能，可使太陽電池整體能源效率提升至 60% 以上，將是太陽電池技術一大突破。這項被稱為太陽光電熱技術(PV/thermal, PVT)被廣泛重視，但至今仍未見大量推廣，主因是太陽電池模組與集熱板整合一體的關鍵技術未能突破。

## 技術摘要(含成果)：

本專利技術「太陽電池熱回收與散熱裝置」，具如下特色：

1. 針對一般太陽電池可回收太陽電池廢熱，提供熱能使用，並提升太陽電池整體能源效率。
2. 針對疊層(tandem)電池不易散熱的問題，提供高性能散熱機構，將疊層太陽電池降溫，並回收熱能，提升太陽電池整體能源轉換效率。
3. 集熱板採用直接接觸太陽電池的設計，在不影響太陽電池封裝下，將集熱板直接接觸於太陽電池背面，達平整貼合之功效，並達到低成本及製作簡易之效果。
2. 集熱板與太陽電池的接觸機構，採用 U 型槽體加上彈簧頂壓設計。達快速組裝及長年可保持固定頂壓力量，維持集熱板與太陽電池的良好接觸，發揮高效率熱傳效果。
3. 集熱板採用平行式多流道塑膠板材設計。成本低、加工方便。

## 優勢：

本專利技術具低成本及組裝簡易快速，並可長年保持高效率散熱效果。

## 競爭產品：

目前國內並無已商品化的相關競爭產品。

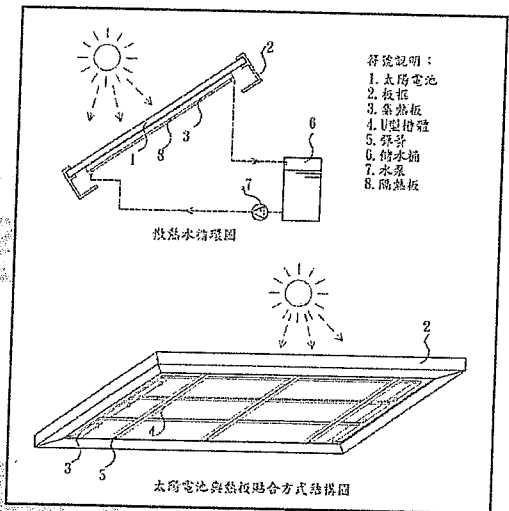
## 專利現況：

本研究團隊自 1997 年開始研究 PVT，具有數十年研究經驗。

## 聯絡方式(請不用填)：

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## Device of waste heat recovery and heat dissipation for solar PV module

**PI :** Prof. Bin-Juine Huang

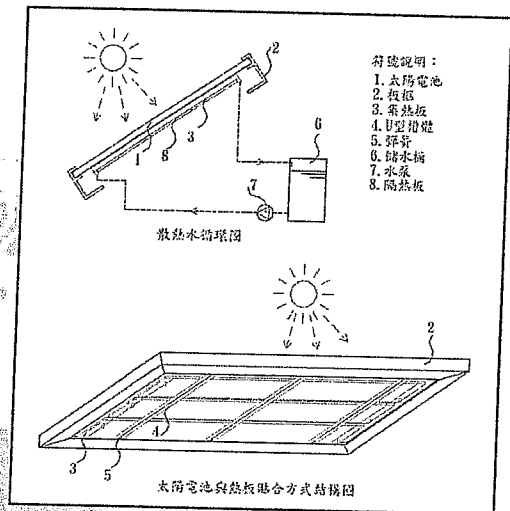
Department of Mechanical Engineering, National Taiwan U.

**Experience:**

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**Market Needs:**

Conversion efficiency of conventional solar module reaches 15~20%. About 80-85% absorbed solar radiation is dissipated as heat to the ambient. Recovering the waste heat for thermal application can increase the overall energy conversion efficiency up to 60% or higher. This is the PV/thermal (PVT) technology which has been aware. But the application of PVT is very little so far. This is mainly caused by the technical problem in the assembly of solar PV module and the thermal collector.



**Our Technology:**

The present invention "Device of waste heat recovery and heat dissipation for solar PV module" has the following features:

1. For conventional solar PV module, it can recover heat and increase the energy conversion efficiency.
2. For tandem solar PV module (e.g. Perovskite and silicone crystalline tandem module), the heat can be dissipated by the PVT collector and recovered as heat for application. The temperature of tandem solar cell can be reduced and the conversion efficiency will not be decreased.
3. The PVT heat collector is designed to tightly attach to the solar PV module back side without influencing the package of the PV module.
4. The direct contact of the PVT collector and PV module is made by a low-cost U-shape elastic body and a simple frame to create a tighten force and a good surface contact to reduce the heat resistance between them.
5. PVT heat collector is made from a low-cost hollow plastic sheet with parallel flow channels.

**Strength:**

The cost of PVT collector is quite low with high long-term reliability.

**Competing Products:**

No such product is available in the market so far.

**Intellectual Properties:**

NTU group has been devoted to the study of PVT technology since 1997.

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